Claims

What is claimed is:

1. An electric motor and brake system, comprising:

a motor portion comprising:

an electrical core surrounded by a frame;

a motor shaft coupled to the electrical core; and

an end shield coupled to the frame located at a drive end of the motor;

an integral field cup and front end shield having a first side and a second side, the first side coupled to the frame located at an opposite drive end of the motor; and

a brake portion coupled to the second side of the integral field cup and front end shield.

2. The system of claim 1, further comprising a first bearing assembly coupled to an inside surface of the end shield, the first bearing assembly being operable to support the motor shaft at the drive end of the motor.

3. The system of claim 2, further comprising a second bearing assembly coupled to the first side of the integral field cup and front end shield, the second bearing assembly being operable to support the motor shaft at the opposite drive end of the motor.

4. The system of claim 3, the first bearing assembly being disposed between a first inner cap and an inside surface of the end shield and the second bearing assembly being disposed between a second inner cap and an inside surface of the first side of the integral field cup and front end shield.

5. The system of claim 1, the second side of the integral field cup and front end shield comprising two concentric ring shaped extrusions and being adapted to support

an electromagnetic coil between the two concentric ring shaped extrusions, the first side integral field cup and front end shield being adapted to support a bearing assembly.

6. The system of claim 5, the integral field cup and front end shield comprising axially extending fins alongside the outside surface of the integral field cup and front end shield, the axially extending fins being adapted to channel airflow.

7. The system of claim 1, the brake portion including an electromagnetic coil supported within the second side of the integral field cup and front end shield.

8. The system of claim 7, the brake portion including a compression spring being disposed between the electromagnetic coil and an armature plate, the armature plate being coupled to a friction disk coupled to the motor shaft wherein the compression spring is operable to move the armature plate and friction disk axially against a stationary plate to hold the motor shaft in a rotatably fixed state.

9. The system of claim 8, the integral field cup and front end shield being formed from a ferromagnetic material and the armature plate being formed from a ferromagnetic material wherein energizing the electromagnetic coil magnetizes the integral field cup and front end shield and the armature plate pulling the armature plate away from the friction disk allowing the motor shaft to rotate freely.

10. The system of claim 9, the brake portion including a fan located outside the fixed stationary plate, the fan being operable to provide cooling air to the motor and the brake.

11. The system of claim 10, further comprising an aluminum shroud to enclose the brake portion from the environment.

12. The system of claim 8, the compression spring being a wave spring.

13. The system of claim 1, the brake portion including a fan located outside the brake portion, the fan being operable to provide cooling air to the motor and the brake.

14. An integral field cup and front end shield, comprising:

a first end adapted to support a bearing assembly of a motor and enclose one end of a motor frame; and

a second end adapted to support an electromagnetic coil of a brake.

15. The integral field cup and front end shield of claim 14, the second end comprising two concentric ring shaped extrusions forming a cup-like portion adapted to house an electromagnetic coil.

16. The integral field cup and front end shield of claim 14, further comprising axially extending fins adapted to channel airflow alongside the outside surface of the integral field cup and front end shield.

17. The integral field cup and front end shield of claim 14, being formed from a ferromagnetic material.

18. A method of fabricating an electric motor and brake system, comprising:

providing an electrical core coupled to a motor shaft, the electrical core being surrounded by a frame;

mounting an end shield to the frame at a drive end of the motor, the end shield housing a first bearing assembly being operable to support the motor shaft at the drive end of the motor;

mounting an integral field cup and front end shield having a first side and a second side, the first side housing a second bearing assembly operable to support the motor shaft at the opposite drive end of the motor; and

coupling a brake portion to the second side of the integral field cup and front end shield.

19. The method of claim 18, further comprising:

inserting an electromagnetic coil into a field cup portion of the integral field cup and front end shield;

providing at least one compression spring disposed over the electromagnetic coil; and

providing an armature plate, friction disk, and stationary plate assembly over the at least one compression spring, the armature plate being axially movable such that the compression spring is operable to move the armature plate and friction disk axially against the stationary plate, the friction disk being coupled to the motor shaft such that holding the friction disk against the stationary plate engages the brake portion and holds the motor shaft in a rotatably fixed state.

20. The method of claim 19, the integral field cup and front end shield being formed from a ferromagnetic material and the armature plate being formed from a ferromagnetic material wherein energizing the electromagnetic coil magnetizes the integral field cup and front end shield and the armature plate pulling the armature plate away from the stationary plate allowing the friction disk and motor shaft to rotate freely.

21. The method of claim 18, further comprising coupling a fan to the opposite drive end of the motor shaft outside the brake portion, the fan being operable to provide cooling air to the brake and the motor.

22. The method of claim 21, further comprising the step of encasing the brake portion and the fan within an enclosure.